

Species limits in some Philippine birds including the Greater Flameback *Chrysocolaptes lucidus*

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Philippine bird taxonomy is relatively conservative and in need of re-examination. A number of well-marked subspecies were selected and subjected to a simple system of scoring (Tobias *et al.* 2010 *Ibis* 152: 724–746) that grades morphological and vocal differences between allopatric taxa (exceptional character 4, major 3, medium 2, minor 1; minimum score 7 for species status). This results in the recognition or confirmation of species status for (inverted commas where a new English name is proposed) 'Philippine Collared Dove' *Streptopelia (bitorquatus) dusumieri*, 'Philippine Green Pigeon' *Treron (pompadora) axillaris* and 'Buru Green Pigeon' *T. (p.) aromatica*, Luzon Racquet-tail *Prioniturus montanus*, Mindanao Racquet-tail *P. waterstradti*, Blue-winged Raquet-tail *P. verticalis*, Blue-headed Raquet-tail *P. platenae*, Yellow-breasted Racquet-tail *P. flavicans*, White-throated Kingfisher *Halcyon (smyrnensis) gularis* (with White-breasted Kingfisher applying to *H. smyrnensis*), 'Northern Silvery Kingfisher' *Alcedo (argentata) flumenicola*, 'Rufous-crowned Bee-eater' *Merops (viridis) americanus*, 'Spot-throated Flameback' *Dinopium (javense) everetti*, 'Luzon Flameback' *Chrysocolaptes (lucidus) haematribon*, 'Buff-spotted Flameback' *C. (l.) lucidus*, 'Yellow-faced Flameback' *C. (l.) xanthocephalus*, 'Red-headed Flameback' *C. (l.) erythrocephalus*, 'Javan Flameback' *C. (l.) strictus*, Greater Flameback *C. (l.) guttacrastatus*, 'Sri Lankan Flameback' (Crimson-backed Flameback) *Chrysocolaptes (l.) stricklandi*, 'Southern Sooty Woodpecker' *Mulleripicus (funebri) fuliginosus*, Visayan Wattled Broadbill *Eurylaimus (steerii) samarensis*, White-lored Oriole *Oriolus (steerii) albiloris*, Tablas Drongo *Dicrurus (hottentottus) menagei*, Grand or Long-billed Rhabdornis *Rhabdornis (inornatus) grandis*, 'Visayan Rhabdornis' *Rhabdornis (i.) rabori*, and 'Visayan Shama' *Copsychus (luzoniensis) superciliaris*. However, *Phapitreron leucotis nigrorum* and *P. l. brevirostris*, *P. amethystina maculipectus*, *Ceyx melanurus mindanensis*, *Orthotomus castaneiceps frontalis* and *Phylloscopus trivirgatus nigrorum* do not quite make species status and require further vocal or other evidence; and Sulu or Black-billed Hanging Parrot *Loriculus bonapartei* and Camiguin Hanging Parrot *L. camiguinensis* are here considered to remain part of Philippine Hanging Parrot *L. philippensis*.

INTRODUCTION

The Philippine Archipelago is notable both for its high biological endemism (Myers 1990, Stattersfield *et al.* 1998) and for the high levels of threat to this endemism (Stattersfield & Capper 2000, Myers *et al.* 2000, Mallari *et al.* 2001). Recently, Peterson (2006) sought to increase the country's complement of avian endemism by producing a list of 'populations' which he regarded as species, and while his methods and conclusions were questioned (Collar 2007) his paper was a signal of the need to reassess the more distinctive taxa currently treated as subspecies in the Philippine avifauna in quest of greater consistency in species-level treatments. This need was given further impetus by Lohman *et al.* (2010), who used molecular evidence to contend that higher levels of taxonomic differentiation exist in the archipelago than are currently recognised.

Species-limits issues are particularly vexing in the Philippines owing to the large number of islands and mountains on which ancestrally related forms have evolved in allopatry. The introduction to Collar *et al.* (1999: 39–41) sought to indicate conservationist sensitivity to this problem; indeed, that publication took upon itself to split, with written justification, two Sulu endemics, Tawi-tawi Brown-dove *Phapitreron cinereiceps* and Sulu Woodpecker *Picoides ramsayi*, where the specimen evidence appeared to be overwhelming and the conservation need pressing. However, Dickinson *et al.* (1991) listed no fewer than 631 subspecies of breeding bird in the Philippines (Collar 2007), and it would be a major research undertaking to assess all of these for their distinctiveness. What follows is merely a review of certain salient cases where relatively straightforward and rapid evaluations might be made using the criteria proposed by Tobias *et al.* (2010), along with a consideration of a few others where species-level status has already been proposed.

METHODS

Objective criteria for delineating species when closely related taxa occur in allopatry have not been easy to find. Helbig *et al.* (2002) proposed a system which required a taxon to exhibit unique

characters, but which accepted as few as two such characters irrespective of their strength. A higher threshold, trialled by Collar (2006), involved a quantitative scoring system for assessing degree of phenotypic difference between allopatric taxa. In this system—modified and developed by Tobias *et al.* (2010)—an exceptional difference (a radically different coloration or pattern) scores 4, a major character (a pronounced and striking difference in the colour or pattern of a body part, or in a measurement or vocalisation) 3, a medium character (a clear difference reflected, e.g., by a distinct hue rather than different colour) 2, and a minor character (a weak difference, e.g. a change in shade) 1; a threshold of 7 is set to allow species status, species status cannot be triggered by minor characters alone, and only three plumage characters, two vocal characters, two biometric characters (assessed for effect size using Cohen's *d* where 0.2–2 is minor, 2–5 medium, 5–10 major and > 10 exceptional) and one behavioural or ecological character may be counted (Tobias *et al.* 2010).

Subspecies of Philippine bird mentioned or illustrated as well marked in Kennedy *et al.* (2000) were placed on a preliminary list for further investigation involving museum skins, as were the 'populations' listed in the appendix of Peterson (2006), along with a number of taxa deemed worthy of investigation by D. N. S. Allen (*in litt.* 2007). These were then subjectively filtered for strength and number of characters to produce a much shorter list of stronger candidates for priority investigation. I then examined specimens held at the American Museum of Natural History, New York (AMNH), Natural History Museum, Tring, UK (BMNH), Delaware Museum of Natural History, Wilmington (DMNH), Muséum National d'Histoire Naturelle, Paris (MNHN), Philippine National Museum, Manila (PNM) and National Museum of Natural History, Washington DC (USNM). Where appropriate, I attempted to measure a sample of 10 individuals of a taxon, seeking a balance between the sexes. Bill was measured from tip to skull, wing curved, tail from tip to point of insertion, with all measurements in millimetres. Means are presented with standard deviation (\pm). An online calculator (<http://www.uccs.edu/~faculty/lbecker/>) was used to determine Cohen's *d* effect sizes (symbol σ) in cases where mensural evidence suggested a strong difference.

I list all perceptible differences for each taxon, but as only the three highest-scoring plumage characters can be counted (usually with these characters in topographic rather than magnitude sequence) I note the remainder with the letter 'u' for 'unscored' but add the score I believe would be appropriate after it in square brackets, in order to give more weight to the profile of the taxon in question. In some cases for lack of adequate sample or time I have not taken measurements of evidently different-sized characters, and therefore do not offer a score, but in all cases I anticipate a score of 1 or 2. In three cases I take the liberty of providing a score of 2 for size difference without supporting evidence from Cohen's *d*: Sulawesi's Yellow-breasted Racquet-tail *Prioniturus flavicans* and Ashy Woodpecker *Mulleripicus fulvus*, for which in reality the only contentious point here is whether that score should in fact be 3, and *Chrysocolaptes lucidus gutta-cristatus*, based on evidence from a secondary source.

RESULTS

1. Suggested and supported changes

Streptopelia (bitorquatus) dusumieri

The form *dusumieri* of the Philippines (with populations introduced to the Marianas and apparently northern Borneo) is strikingly disjunct from nominotypical *bitorquatus* (Island Collared Dove), which ranges from Java to Timor (Baptista *et al.* 1997, Gibbs *et al.* 2001). The two taxa are distinct on a suite of characters, none particularly strong, the tail pattern being most obvious.

In the nominotypical the outer vane of the outermost rectrix (upperside) is pale grey, not contrasting with the inner vane of the same feather, with the distal half of each feather shading progressively darker towards the central feathers, whereas in *dusumieri* the outer vane of the outermost rectrix is white along its length, the inner vane black basally and mid-grey distally, while the other feathers are also mid-grey, so that the contrast of the white outer vane is striking (2). In the nominotypical the undertail is blackish basally, whitish-grey distally, the separation occurring in a sharp line at mid-shaft, whereas in *dusumieri* the undertail is blackish shading to dull mid-grey on the last 20%, the contrast only being supplied by the white outer vane of the outermost rectrix (2). The form *dusumieri* is a paler, weaker greyish-pink below, with the throat and belly to vent much whiter (1). These are the three strongest plumage differences, but it is worth noting that dorsally *dusumieri* is also paler greyish-brown, but the grey of the lesser, median and greater coverts is darker and less contrasting than in the nominotypical; the grey hindneck-patch is paler but sometimes with whitish centres to the feathers, creating a mild scaly effect, and with much less or none of the white upper and lower edging; the entire head of *dusumieri*, including the nape, is pink-tinged whitish-grey, paler towards the frontal area, whereas the nominotypical has a purer grey crown (palest frontally) but a slightly rusty-tinged greyish-pink face (malar to ear-coverts and postocular area) and nape; in both taxa the respective colours

of the breast continue around the lower hind-neck, below the neck-patch onto the mantle, but this band of colour is twice as wide in the nominotypical as in *dusumieri*. The bill of *bitorquatus* averages longer than that of *dusumieri* (*bitorquatus* 22.80 ± 0.79 , $n = 10$; *dusumieri* 20.90 ± 0.88 , $n = 10$; $\sigma 2.28$) (2).

S. de Kort (*in litt.* 2010) has kindly forwarded recordings of 'perch coos' of the two forms that suggest their strong divergence. Javan *bitorquatus* has a three-note song with a thick rolling throaty quality: *rra RARRRR ru* (two songs in five seconds; first note highest, second lower and longest, third lowest and shortest); Luzon *dusumieri* has a brisker three-note *WA wu-WAA*, with a different stress and pure quality with no guttural tone (two songs in four seconds; first note highest, second lowest and shortest, third longest and slightly lower than first); Figure 1 shows these differences. A wider sample of recordings to confirm them is needed before these vocalisations can be considered taxon-specific, but in any case a total score of 7 is achieved even without vocal analysis.

The name 'Philippine Collared Dove' seems appropriate for *S. dusumieri*.

Treron (pompadora) axillaris and *T. (p.) aromatica*

Rasmussen & Anderton (2005) treated Pompadour Green Pigeon *T. pompadora* as at least four species, and this view seems likely to prevail. However, they did not consider the form *axillaris* (along with *amadoni*, *canescens* and *everetti*) of the Philippines or indeed *aromatica* of Buru, although they remarked on the probable specific status of both.

The Philippine taxa are distinct from *phayrei* (Himalayas to Vietnam) and *affinis* (India) on account of their red cere or base of bill (2), much larger (deeper and longer) bill (not measured), bluish-grey (not reddish-pink) legs and feet (3), blackish-grey carpal area (u [2]) and white (not creamy-brown) undertail-coverts (3), in addition to which they lack the orange-yellow breast-patch (u [2]) and maroon (not chestnut) back (u [2]) of *phayrei*, and the much less distinctly yellow throat (u [2]) of *affinis* (note some of the foregoing differences are male-only characters). The voice is reported to be different from other forms in the *pompadora* complex (R. O. Hutchinson verbally 2010). A total score of 8, likely to increase when sufficient data are available to score bill size and voice, indicates species status for *axillaris* ('Philippine Green Pigeon').

However, *axillaris* must also be compared to *T. (p.) aromatica* of Buru, apparently the taxon closest in plumage to the four subspecies that make up *axillaris*. The form *aromatica*, whose distinctiveness was pointed out by Rheindt & Hutchinson (2007), differs in having no red cere (2), a deeper-shaded but much less extensive maroon back (2), much more yellow in the wing-coverts and on remex edges (u [1]), grey of crown somewhat bluer, more clear-cut and extending more round the back of the ear-coverts to give fuller coverage of nape (u [2]), reddish-purple legs and feet (3) and a smaller bill (unmeasured). This gives a total score of 7 and accords *aromatica* ('Buru Green Pigeon') species status.

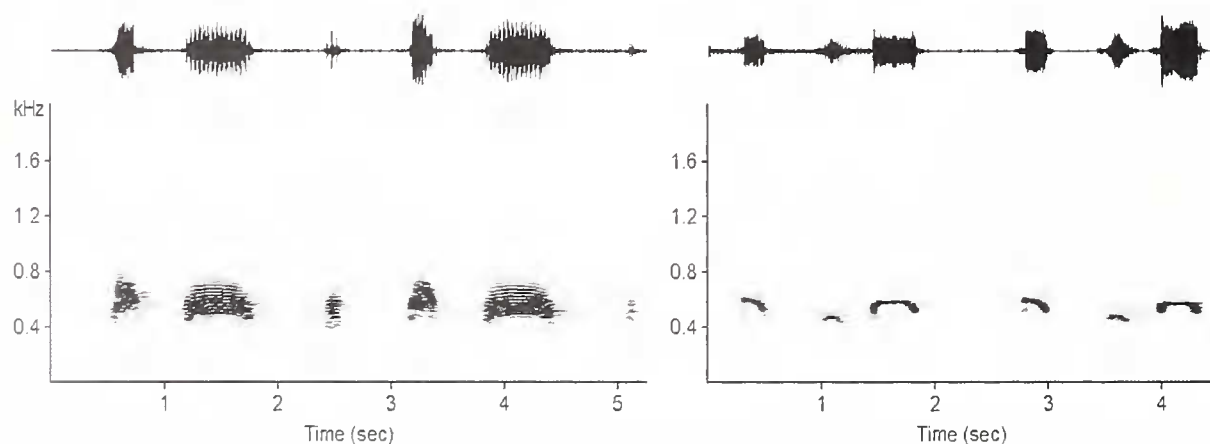


Figure 1. A waveform (top) and spectrogram of two perch coos each of *Streptopelia (bitorquatus) bitorquatus* from Java (left) and *S. (b.) dusumieri* from Luzon (right).

Spectrogram parameters: FFT size = 512, Window = Hamming, Bandwidth = 10 Hz. Figures provided by S. de Kort based on recordings in his possession.

Some *Prioniturus* parrots

Forshaw (1989) treated Luzon Racquet-tail *P. montanus* (Luzon), Mindanao Racquet-tail *P. waterstradti* (Mindanao) and Blue-winged Racquet-tail *P. verticalis* (Sulu Islands) as one species, while Dickinson *et al.* (1991), Inskipp *et al.* (1996), Kennedy *et al.* (2000) and Dickinson (2003) considered *P. montanus* and *P. waterstradti* as conspecific but allowed *verticalis* species status (a strange arrangement, given that in plumage at least *verticalis* is closer to geographically distant *montanus* than to geographically adjacent *waterstradti*). Sibley & Monroe (1990), Collar *et al.* (1994, 1999, 2001), Collar (1997a), King (1997), Juniper & Parr (1998), Stattersfield & Capper (2000), and Clements (2007) treated all three taxa as species, and although there seems little doubt that the three are closely related—despite the assertion in Sibley & Monroe (1990) that *verticalis* is actually more closely related to Blue-crowned Racquet-tail *P. discurus* (for which see further below)—they can be separated as follows:

- *waterstradti* differs from *montanus* and *verticalis* in the absence of a red crown-patch (3), absence of blue surrounding the red crown-patch (perhaps co-variable with the red crown-patch, hence: u [2]), no blue in the uppertail (2), somewhat smaller size (some mensural overlap in Forshaw 1989), score so far 5, plus (from *montanus*) lack of turquoise-blue on the face and head-sides (2; total score 7), and (from *verticalis*) smaller bill with virtually no overlap (data in Forshaw 1989), lack of pale turquoise tone to rear head-sides and nape (u [1]), strong yellowish mantle sharply delineated from nape (2) and paler yellow-green underparts (u [1]; total score 7);

- *montanus* differs from *verticalis* in redistribution of blue on head, with turquoise-blue on face and head-sides but no turquoise tone to rear head-sides and nape (3), no strong yellowish mantle sharply defined from nape (2), paler yellow-green underparts (1), paler blue in the uppertail (u [1]), plus smaller bill and shorter wing (male bills 18–21 [19.8] vs 21–22 [21.6], male wings 161–171 [164.8] vs 163–185 [174.6] in Forshaw 1989) (at least 1) (total score 7).

Ostensibly greater difficulty in deploying these numerical criteria arises when comparing *verticalis* with the Yellow-breasted (Red-spotted) Racquet-tail *P. flavicans* of Sulawesi. These two forms are considerably closer in plumage than *verticalis* is to *montanus*, but are separated by the substantially larger size of *flavicans* (2; see final sentence of Methods), redistributed head colours with richer blue crown and greener, less turquoise-tinged head-sides (2), lack of blue in tail (2) and stronger mustard-yellow tones on mantle and breast (1), total score 7. On the other hand, Inskipp *et al.* (1996) followed the view, no longer current, that *flavicans* is a subspecies of *P. discurus*. In this case, *flavicans* can be separated from *discurus* on its much larger size (2; see final sentence of Methods), presence of a red crown-patch (3), mustard-yellow tones on mantle and breast (2) and lack of blue in tail (2), total score 9. For reference on size (mm), Forshaw (1989) gives male *verticalis* bill 21–22 (21.6), tarsus 18–20 (18.9), wing 163–185 (174.6), tail 125–146 (136.0) (n=7), male *flavicans* bill 22–25 (23.4), tarsus 19–21 (19.9), wing 176–194 (184.4), tail 150–181 (164.7) (n=11); male *discurus mindorensis* (largest race) bill 19–22 (21.1), tarsus 16–20 (18.2), wing 161–174 (167.7), tail 124–144 (131.8) (n=11) (no overlap at all in tail between *flavicans* and the other two species).

Prioniturus discurus differs from *montanus* in the absence of a red crown-patch (3), lack of turquoise-blue on face and head-sides (1) and brighter green underparts (1), but is in any case sympatric with it; from *waterstradti* by absence of major area of blue on crown (2), presence of blue in the uppertail (2) and duller green nape and neck-sides (1), but is again sympatric; and from the allopatric *verticalis* by the absence of a red crown-patch (3), greener, less turquoise-tinged head-sides and underparts (2), absence of strong yellowish mantle sharply defined from nape (2), and duller blue in primaries and tail feathers (u [1]), total score 7. Since Forshaw (1989)

considered Palawan's *platenae* conspecific with *discurus*, it may be worth noting that *platenae* differs from *discurus* in having the entire head blue and of a more turquoise-tinged colour (3), upperparts greyish-green (2) and underparts pale green-blue with yellower undertail-coverts (2), total score 7.

Halcyon (smyrnensis) gularis

The Philippine form *gularis* of White-throated Kingfisher, a species that extends from Turkey to Taiwan, is highly distinctive, owing to the absence of white on the breast and belly, restricting it to the throat (3); a much larger and darker wing-patch involving elongated median coverts, and consisting of (a) black rather than brownish-sooty coloration, (b) black rather than chestnut-brown lesser wing-coverts, (c) black rather than dull blue tips to the median coverts, and (d) elongate median coverts so that the feature is three-quarters the length of the folded wing (3); black rather than blackish-grey tips to primaries (1); and by comparison with *H. s. fokiensis* (the nearest population geographically) a shorter tail (*fokiensis* mean 88.8 ± 1.1 , n = 10; *gularis* mean 81.4 ± 1.4 , n = 10; $\sigma = 5.73$) (3); total score 10.

It would be more appropriate for the Philippine species to retain the name White-throated Kingfisher and for the remaining populations to be known, as they often are, as White-breasted Kingfisher. Otherwise Brown-breasted Kingfisher might be applied to *H. gularis*.

Alcedo (argentata) flumenicola

Silvery Kingfisher is endemic to the Philippines with two subspecies: *argentata* in Mindanao, Basilan, Dinagat and Siargao, and *flumenicola* in Samar, Leyte and Bohol (Dickinson *et al.* 1991, Collar *et al.* 1999). The form *flumenicola* differs from the nominotypical in having buff (not white) lores, ear-covert flash and chin to throat (but the upper breast and separate belly-patch remain white as in *argentata*) (3); rich royal blue lower breast and flanks (not shading rapidly to greenish-blue on upper belly and flanks as in *argentata*) (2); and an overall smaller size (*argentata* mean wing 60.6 ± 1.9 , n = 10; *flumenicola* 55.7 ± 1.89 , n = 10; $\sigma = 2.59$) (2).

The two species could be renamed Northern (*flumenicola*) and Southern (*argentata*) Silvery Kingfisher.

Merops (viridis) americanus

Blue-throated Bee-eater *M. viridis* ranges from southern China and South-East Asia to the Greater Sundas (all nominotypical *viridis*) and the Philippines (race *americanus*) (Dickinson *et al.* 1991). Philippine birds differ from nominotypical in having the blue of the throat and upper breast reduced to a slight tinge spreading from the malar area, so that the underparts appear virtually all green (2); crown to mantle rich rufous rather than dark chestnut (2); wing feathers and wing-coverts with little or no metallic mid-blue coloration (u [1]); much broader and unfraying vanes to central rectrices, with (a) their shafts remaining black (rather than shading to white), (b) the vanes retaining the intense blue of the rest of the tail (rather than shading to pale greenish or fraying to nothing) and (c) broadly and squarely tipped with black (rather than tapering to two pale bare points) (three characters combining in one feature to render it highly distinctive, hence 3). Morphometric differences are not obvious: *americanus* may average slightly larger, but my sample at BMNH indicated overlap in lengths of bill, wing, tail and tail extension. Marks *et al.* (2007) reported a 3.8% genetic divergence in *americanus* from Bornean *viridis* but made no suggestion that the two should be separated as species. However, a score of 7 produces such a split; a possible name would be Rufous-crowned Bee-eater.

Dinopium (javense) everetti

The Common Flameback *D. javense* consists of six subspecies of which (despite the great disjunction of the form *malabaricum*) only

one, the Philippine endemic *everetti*, is ever described as distinctive (e.g. in Short 1982, Winkler *et al.* 1995, Winkler & Christie 2002).

The three strongest plumage differences between *everetti* (which is confined to Palawan, Balabac, Busuanga and Culion) and *D. j. raveni* (the closest neighbour of *everetti* in north-eastern Borneo) are its virtually plain brown breast (in *raveni* the underpart scaling is boldest of all taxa in *D. javense*) (2); greatly reduced white postocular superciliary stripe (broad in *raveni*), the product of a rather broader black postocular eyestripe and of the red of the crown extending more onto the headside and behind the ear-coverts (2); and (in the female) a matt-black crown with slightly paler (essentially invisible) shaft-streaks (occasionally with tiny white spots) and with a red nape, whereas female *raveni* has a glossy black crown and nape, with bold white spotting (3). Apart from these features, the underpart scaling below the breast is subtly different in pattern, each feather having in *everetti* a dark centre and very broad pale outer area (sometimes with a very narrow dark edge), and in *raveni* an entirely pale centre and a fairly broad dark edge, so that *everetti* appears rather more mottled (or even semi-barré) than heavily scaled (u [1]); *everetti* has central throat and chin lightly peppered black, whereas *raveni* has this area white except for a string of bold black streaks usually forming a near-continuous black mesial line (u [1]); male *everetti* has a vague reddish stain on a relatively poorly marked dark submoustachial area (none in male *raveni*, in which the submoustachial area is a bolder blackish line) (u [1]).

In these comparisons *raveni* is effectively typical of all non-Philippine *javense*. There may be other minor differences: male *everetti* seems to have a brighter red crown and marginally more golden mantle than male *raveni*, for example, but these are not significant. Short (1982) reported that 'the tail of *everetti* is proportionately (to wings) shorter than in other races of the species', but checks on several representatives of *everetti* and *raveni* did not immediately confirm this. The illustration of male and female *everetti* in Winkler *et al.* (1995) shows the black eyestripe connecting to the black lateral neck-stripe (where in other forms the neck-stripe connects with the moustachial stripe), but this seems to be a slip. However, a score of 7, based on the above, lifts *everetti* to species level, for which D. N. S. Allen (*in litt.* 2008) proposes the name 'Spot-throated Flameback'.

The *Chrysocolaptes lucidus* complex

'The species *Chrysocolaptes lucidus* comprises many very distinct forms', wrote Winkler *et al.* (1995:8), 'some of which may be shown by future research to be full species'. Mees (1986, 1996) sought to split the Javan form *strictus* and South-East Asian *guttacristatus* but either these papers were overlooked or their lack of morphological analysis was considered an obstacle to the acceptance of his views. Meanwhile, concern over the conservation status of several of these forms in the Philippines—where, incidentally, all taxa differ from all others elsewhere in Asia in lacking the bold clear white postocular stripe (present in both sexes) and in having red eyes—triggered a minor degree of public hand-wringing (Collar 1997b, 2003, Collar *et al.* 1999:40), and Winkler & Christie (2002) reaffirmed that taxonomic revision was urgently needed because of the possibility that newly determined species might be at risk. Rasmussen & Anderton (2005) also took the view that *Chrysocolaptes lucidus* was 'substantially overlumped', but, because dealing with South Asia, they only separated out one form, 'Crimson-backed Flameback' *C. stricklandi* of Sri Lanka. This process can now be advanced, taking each of the 13 taxa accepted by Winkler & Christie (2002) in turn. In this review where I have not been able to review taxa for myself I indicate the differences in question by reference to the relevant literature.

C. l. haematribon differs from the nominotypical in having the ground colour of the female's head black, not dirty yellow (score 3, based on 2 for black background + 1 for smaller and whiter spotting

on it), blackish ear-coverts and rear neck-sides (2), no extensive broad buff spotting on the underparts but instead more densely spotted with smaller spots on the throat (2), changing sharply to a very weakly marked dirty yellowish-tinged buff from mid-breast to vent with obsolete, blurry-edged scaling or barring (u [1]), and slightly more crimson (less scarlet) crown (male) and upperparts (u [1]); total score 7.

C. l. rufopunctatus differs from the nominotypical in having rather clear pinkish-brown spotting on the crown and supercilium (female) (2), a pink wash to the submoustachial stripe (1) and a more strongly red back (2); total score 5.

C. l. montanus differs from the nominotypical in having the back entirely or almost entirely golden rather than reddish-golden (2).

C. l. xanthocephalus differs from *haematribon* in its all-yellow face (both sexes) (3), yellow crown (female) (3), brighter red crown (male), back and wings (1), less dense and contrasting spotting on the throat (u [1]), pale (dirty flesh-coloured) legs (u [1]) and almost plain dull yellow underparts (u [1]); total score 7. It differs from the nominotypical in the first two characters (yellow face and female crown) (6), plain yellow belly (2) and pale legs (u [1]); total score 8.

C. l. erythrocephalus differs from *haematribon* in its golden back (3), red head-sides (3), yellow-and-olive-flecked crown (female) (3), yellowish bill (u [2]), blackish ear-covert spot (u [1]), pinkish chin (u [1]), and underpart pattern like the nominotypical (u [2 + 1, on the basis of the scoring above for *haematribon*]); total score 9. It differs from the nominotypical in five of the six first characters listed above (not the golden back, but allowing 2 for yellowish bill) (total allowable 8), plus a yellow-and-olive-flecked crown (female) (u [2]); total score 8. It differs from *xanthocephalus* in its golden back (3), red head-sides (3), yellowish bill (2), blackish ear-covert spot (u [1]), pinkish chin (u [1]), yellow-and-olive-flecked crown (female) (u [1]) and underpart pattern like the nominotypical (u [2]); total score 8.

C. l. strictus most closely resembles *C. l. haematribon* and *C. l. montanus* but differs from both in the broad white supercilium (2) and broader black postocular stripe through ear-coverts to hindneck (3), brighter yellow crown with a few irregular black streaks rather than any close spotting (female) (2 for *montanus*; u [2] for *haematribon*), brighter red crown (male) (u [1]), greatly reduced red on the rump (u [1]), plus (compared to *haematribon*) yellowish-golden upperparts (3) and an underpart pattern like the nominotypical (u [2 + 1]), total score 8, and (compared to the nominotypical) brighter and yellower upperparts (u [1]), total score 7.

C. l. kangeanensis differs from *strictus* in a series of evidently very minor features (Winkler & Christie 2002).

C. l. guttacristatus differs from *strictus* in being substantially larger (2; see final sentence of Methods)—Winkler *et al.* (1995: 378) give a bill size of 50–64 mm where no other form measured exceeds 46 mm, and a weight of 150–233 g where no other form measured exceeds 164 g—and having a white-spotted black head (female) (3), much fuller complement of red on the rump (extending up the back) (2), stronger golden upperparts (1), bolder moustachial, malar and mesial stripes (u [1]) and bolder-patterned underparts (u [1]), total score 8.

C. l. chersonesus (called *indomalayicus* by Mees 1986, 1996) is slightly smaller than *C. l. guttacristatus* (1). Measurements of *chersonesus*, which is the smallest of the subspecies of the proposed new *C. guttacristatus* below, show that while bill length is only marginally longer than *strictus* wing length is decidedly longer (on a small sample of four males of each taxon in BMNH, *chersonesus* has bill 47, wing 153.25; *strictus* bill 44.75, wing 141; with bill 39, wing 143.7 in 28 *xanthocephalus* for comparison), in which case a score of 1 would clearly apply to *guttacristatus* with its three subspecies below and reduce its total score *vs strictus* to 7.

C. l. socialis, slightly larger than *chersonesus*, differs in a few minor characters (score perhaps only 2) from *guttacristatus* (Winkler & Christie 2002), although it is worth noting that Rasmussen & Anderton (2005) reported 'extraordinarily different acoustic signals' that mean that, in their view, even this form is 'probably better treated as a full species'.

C. l. andrewsi is similar to but slightly larger than *chersonesus* but (*fide* Amadon 1943) has underpart feathers fringed brownish or brownish-black instead of black and with centres washed brownish (1).

C. l. stricklandi differs from *guttacristatus* in having crimson (not golden) upperparts (3), a yellow (not black) bill (2), a much weaker postocular superciliary stripe (reduced to spots) (2) and a weaker supramoustachial line (u [1]), total score 7.

Always accepting that new insights may result as and when vocal and other evidence is assembled, it meanwhile seems reasonable to propose that this complex be broken into seven species, in the following arrangement (English names suggested for simplicity of reference).

- Luzon Flameback *Chrysocolaptes haematribon*
- Luzon, Polillo, Marinduque, Catanduanes
- Buff-spotted Flameback *Chrysocolaptes lucidus*
- C. l. rufopunctatus* Samar, Biliran, Leyte, Calicoan, Bohol, Panaon
- C. l. lucidus* Basilan, W Mindanao
- C. l. montanus* C&E Mindanao, Samal
- Yellow-faced Flameback *Chrysocolaptes xanthocephalus*
- Ticao, Masbate, Panay, Guimaras, Negros
- Red-headed Flameback *Chrysocolaptes erythrocephalus*
- Balabac, Palawan, Calamian group
- Javan Flameback *Chrysocolaptes strictus*
- C. s. strictus* SW, C & E Java, Bali
- C. s. kangeanensis* Kangean Islands
- Greater Flameback *Chrysocolaptes guttacristatus*
- C. g. socialis* W coast of India
- C. g. guttacristatus* NW India to S China, Indochina and Thailand
- C. g. chersonesus* Peninsular Malaysia, Sumatra, coastal NW Java
- C. g. andrewsi* coastal NE Borneo
- Sri Lankan Flameback *Chrysocolaptes stricklandi*
- Sri Lanka

Mulleripicus (funnebris) fuliginosus

Fide Dickinson *et al.* (1991), it was Delacour & Mayr (1945) who were responsible for uniting the form *fuliginosus* with Sooty Woodpecker *M. funnebris*, and, although Peters (1948) kept them separate, all subsequent lists and treatments have accepted the lumping of the two. Nevertheless, southern *fuliginosus* (Samar, Leyte and Mindanao) differs from northern nominotypical *funnebris*, *mayri* and *parkesi* (Luzon, Polillo Islands, Catanduanes and Marinduque) in being distinctly paler in body plumage (2), with the red on the male's face confined to the submoustachial streak (2) but much brighter (scarlet rather than burgundy) (2), larger white spots on chin, throat, upper neck, neck-sides and hind-crown (u [1]), and overall slightly smaller in body size but with the tail significantly shorter (*funnebris* mean 127 ± 6.8 , $n = 21$; *fuliginosus* 103 ± 6.5 , $n = 21$; $\sigma = 3.6$) (2) and, for some curious reason, with the vanes in the rectrices almost invariably frayed and ragged. The difference between shades of red on the head of *fuliginosus* is not mentioned or illustrated in Winkler *et al.* (1995) or in Winkler & Christie (2002), while it is illustrated but not mentioned in Short (1982). The late T. H. Fisher (verbally 2009) reported that *funnebris* on Luzon has a piping call like a soccer referee's whistle which he never heard from *fuliginosus* on Mindanao, but this difference cannot be scored until detailed studies confirm it. Nevertheless, a score of 8 returns

fuliginosus to the status accepted by Peters; but to emphasise their similarity the two species might be called Northern Sooty and Southern Sooty Woodpecker.

It is important to consider here also Ashy Woodpecker *Mulleripicus fulvus* from Sulawesi. Although no-one has suggested its conspecificity with its Philippines congeners, this bird does greatly resemble Northern Sooty in shape and head pattern and Southern Sooty in shade of red on the head. However, Ashy is uniformly buff below including on the chin (3), with an all-black bill (2), and is very considerably larger (such that Cohen's *d* effect size would be at least 2; see final sentence of Methods), Winkler *et al.* (1995) giving wing of *fulvus* 176–192 *vs* *funnebris* 147–171, suggesting no overlap.

Eurylaimus (steerii) samarensis

Inskipp *et al.* (1996) (a) pointed out that Delacour & Mayr (1945) lumped *E. steerii* and *E. samarensis* 'despite noting that they differed "clearly in size and color"', (b) observed that Lambert (1996) treated the taxa as separate species for the same reasons, and (c) opted to treat them as separate species, as subsequently did BirdLife International (Collar *et al.* 1999, 2001, Stattersfield & Capper 2000) and Bruce (2003). Dekker & Dickinson (2000) curiously remarked that Delacour & Mayr's (1945) treatment had been 'universally followed since' before proceeding to discuss Lambert's (1996) alternative treatment, and concluding that 'the distinctions summarized by them for *samarensis* and *steerii* are not convincingly demonstrative of specific differentiation'. This position has fed through to Kennedy *et al.* (2000) and Dickinson (2003), where the species is known as Wattled Broadbill.

The form *samarensis* differs from *steerii* in its all purplish-pink (not slaty-grey) mantle, back and scapulars (3), mottled grey not white collar (2), lilac-pink not yellow edges to the white bar on the outer secondaries (2), and distinctly smaller size, most strongly expressed in its notably shorter tail (*steerii* mean 62 ± 2 , $n = 16$; *samarensis* 52 ± 2.5 , $n = 13$; $\sigma = 4.5$) (2), total score 9.

Oriolus (steerii) albiloris

Collar (1998) rehearsed the evidence supporting specific status for White-lored Oriole *Oriolus albiloris*, but in a way that could easily be missed. Kennedy *et al.* (2000) and Dickinson (2003) continued to treat it as part of Philippine Oriole *O. steerii*, and Dickinson (2004) maintained that 'the facial markings on *albiloris* are characteristic, but it is hard to see these as of specific importance given the closer overall resemblance to *steerii* and the sustained if rather faint streaking of the underparts'. Walther & Jones (2008) evidently agreed.

None of these authors takes account of the considerably shorter, smaller bill of *albiloris* in relation to all other subspecies of *steerii*, although this was hinted at in Collar (1998). Unfortunately at present a good sample has not been assembled owing to specimen diaspora and number of subspecies, but if preliminary findings may be taken as indicative, *albiloris* has a mean bill length of 21.8 mm (range 21–22, $n=4$) while four other subspecies of *steerii* taken together have one of 25.8 mm (range 23–28, $n=19$). In plumage, *albiloris* differs from all other forms of *steerii* in having yellow underparts with very faint streaking (only on flanks) as against various combinations of grey, grey-on-white streaking and black-on-white streaking (4), white lores and chin (a striking feature representing a major difference: 3), and more uniform and paler yellowish-olive on crown and upperparts (1); one does not even require the addition of a score for the bill size for this to establish species status for *albiloris*.

Somewhat surprisingly, a recent study has found that *albiloris* is genetically so close to Isabela Oriole *O. isabellae* that they should 'perhaps... be treated as a single taxonomic unit' (Jönsson *et al.* 2010). However, the notion of their conspecificity cannot be seriously entertained, given their sympatry in at least two areas of Luzon (Bataan and Cagayan: Kennedy *et al.* 2000), which precludes a

scoring exercise, and given their considerable morphological differences (broad white lores and small reddish bill in *albiloris*, narrow yellowish lores and large grey-blue bill in *isabellae*, among other things: Collar 1998).

Dicrurus (hottentottus) menagei

The form *menagei*, whose taxonomic and conservation status have been highlighted before (Collar 1997b, 2003, 2007, Allen 2006), was elevated to species level from Hair-crested Drongo *D. hottentottus* by Rocamora & Yeatman-Berthelot (2009), although in their introductory material (p.173) they admit that such a move 'will require further corroboration'. The characters that distinguish *menagei* (measurements taken from *D. b. cuyensis* and *D. b. palawanensis* as the two geographically closest forms) are its

- notably elongate outertail feathers with a strong terminal twisting (*menagei* mean 176.4 ± 10.6 , $n = 20$; *cuyensis* 135 ± 4.18 , $n = 9$; *palawanensis* 131 ± 5.42 , $n = 10$; effect size *vs cuyensis* = 5.14 and *vs palawanensis* 5.32) (3);
- curiously frayed and degenerate wing and tail feathers, the latter distinctly narrower than in other *hottentottus* (2);
- loss of gloss on flight and body plumage, leaving the underparts, mantle, back and scapulars matt blackish-brown (2).

Allen (2006) suggested that in their reduced quantity as well as in their quality the vocalisations of *menagei* might be distinguishable from other geographically close forms, but considerable study is needed to determine the true distinctiveness of these traits; decline in frequency of singing and calling might simply be a cultural response to the scarcity of neighbours, as reported in a *Myadestes* thrush (see Collar 2005: 561). Meanwhile, a score of 7 produces a species-level split.

Rhabdornis (inornatus) grandis and *R. (i.) rabori*

The status as a full species of what Kennedy *et al.* (2000) called the 'Grand Rhabdornis' *R. grandis* ('Long-billed Rhabdornis' in Sibley & Monroe 1990, Dickinson *et al.* 1991, Inskipp *et al.* 1996, King 1997, Clements 2007) has been questioned by Dickinson (2003), who 'believes this to be simply a large subspecies'.

Compared to other taxa in the *R. inornatus* complex, the form *grandis*—albeit on a tiny sample size, owing to the great scarcity of specimens—has a massive bill (on the basis of two PNM specimens measuring 24 and no other *inornatus* taxon having a mean greater than 19.5, I score this 3), and is much blacker on the mask (lores to ear-coverts) and in the primaries (2), greyer on the crown (1), whiter on the underparts (1) and darker brown on the back, wing-coverts, tertials and inner secondaries (u [1]), although in other mensural characters, contrary to the evidence (a small sample size) in the original description (Salomonsen 1952), it is extremely similar to *inornatus* and thus only merits the name *grandis* in view of its bill.

The first suggestion that the form *rabori*, which is not even illustrated in Kennedy *et al.* (2000), might merit specific status came from Peterson (2006), who correctly distinguished between the more broadly light grey throat and stronger streaking of Negros 'populations' (= *P. i. rabori*) and the more restricted grey throat and weaker streaking of other taxa in the *inornatus* complex. In proportions *rabori* is actually rather larger than all other subspecies of *inornatus* (including, with the exception of the bill, *grandis*), and has a proportionately much longer tail (*rabori* mean 63.9 ± 2.1 , $n = 15$; *P. i. alaris* 54.8 ± 2.31 , $n = 15$; $\sigma = 4.1$) (2); facially it is also distinctive, with a pale brownish-grey (not brownish-black) mask, more diffuse, broken-up supercilium and a paler, greyer crown, altogether making for a rather featureless head (3), browner-grey throat (1) and black blotches on lower hindneck (2). This yields 'Visayan Rhabdornis' a score of 8. The other three taxa (*inornatus*, *leytensis* and *alaris*) belong together and it is fairly hard to see the basis on which they merit even subspecific recognition.

Copsychus (luzoniensis) superciliaris

All recent treatments have retained the West Visayan form *superciliaris* of White-browed Shama *C. luzoniensis* as conspecific. Collar (2005), noting the lack of both rufous rump and white wing-patch, commented: 'morphologically distinctive; if found to be equally distinctive vocally, may perhaps better be treated as a separate species'. Peterson (2006) picked out the same characters. However, closer inspection and measurement of specimens reveal that there are another three characters which further distinguish male *superciliaris* from *luzoniensis*: (a) purer whitish flanks (*luzoniensis* has the flanks tinged buffy-rufous, which only show as a very slight buffy-grey discoloration in *superciliaris*), (b) absence or only vestigial presence of the prominent white tail-tips, and (c) distinctly shorter tail despite a very slightly larger size overall, and longer legs (in my samples only males were measured). On this basis *superciliaris* can be scored on all-dark rump (3), all-dark wings and tail (wings and tail seem best combined) (3), shorter tail with reduced white tips (*luzoniensis* mean 82.4 ± 2.69 , $n = 15$; *superciliaris* 69 ± 2.94 , $n = 14$; $\sigma = 4.75$) (2), longer legs (*luzoniensis* mean 26.3 ± 1.1 , $n = 15$; *superciliaris* 29.2 ± 1.07 , $n = 13$; $\sigma = 2.71$) (2) and whiter underparts (u [1]). Thus without the need for vocal evidence—which may not in fact be greatly informative, since both *luzoniensis* and *superciliaris* are inveterate mimics (D. N. S. Allen *in litt.* 2008)—a total score of 10 carries 'Visayan Shama' to species level.

This split has already been promoted on molecular evidence (Lim *et al.* 2010).

2. Taxonomic challenges requiring further documentation

Phapitreron leucotis nigrorum and *P. l. brevirostris*

The central Philippine form *nigrorum* (Calagna-an, Cebu, Guimaras, Masbate, Negros, Panay, Sibuyan, Tablas, Ticao: Dickinson *et al.* 1991) differs from nominotypical White-eared Brown Dove *P. leucotis* (Alabat, Catanduanes, Lubang, Luzon, Marinduque, Mindoro, Verde) in having a buffy (not vinous-russet) throat (2), buffy (not white) subciliary streak (2), brownish-grey (not pale grey) forecrown shading to greenish (not bronzy-russet) hindcrown and greener, less pinkish mantle and neck-sides (2), and a distinctly shorter wing (*leucotis* mean 128 ± 3.27 , $n = 10$; *nigrorum* 122 ± 2.24 , $n = 9$; $\sigma = 2.02$) (2); total score 8.

It differs from the form *P. (l.) brevirostris* (Biliran, Bohol, Calicoan, Camiguin Sur, Dinagat, Leyte, Mindanao, Samar, Siargao, Siquijor, with *occipitalis* on Basilan and Jolo) in having a buffy (not buffy-whitish) throat (1), buffy (not white subciliary) streak (2), brownish-grey (not strong buffy-white) forecrown shading to greenish (not pinkish) hindcrown and greener, much less pinkish mantle and neck-sides, weaker metallic blue centre to mantle (2), and a longer tail (*nigrorum* mean 89.4 ± 3 , $n = 9$; *brevirostris* 83.7 ± 3.23 , $n = 10$; $\sigma = 1.84$) (1); total score 6.

The form *brevirostris* differs from the nominotypical in having a buffy-whitish (not vinous-russet) throat (u [1]), strong buffy-white (not pale grey) forecrown (2), strong pink (not bronzy-russet) hindneck, pinker tinge on neck-sides and breast (1), stronger metallic blue centre to mantle (1), and shorter bill (*leucotis* mean 20.5 ± 0.53 , $n = 10$; *brevirostris* 18.6 ± 0.7 , $n = 10$; $\sigma = 3.07$) (2); total score 6.

With scores of 6 the forms *brevirostris* and *nigrorum* almost achieve species status from *leucotis*. Clearly, vocal and other evidence will be decisive in these cases.

Phapitreron amethystina maculipectus

The form *maculipectus* of Amethyst Brown Dove *Phapitreron amethystina* seems never to have been regarded as more than a subspecies, at least in the past 70 years (Peters 1937, Goodwin 1970, Sibley & Monroe 1990, Dickinson *et al.* 1991, Inskipp *et al.* 1996, Baptista *et al.* 1997, King 1997, Kennedy *et al.* 2000, Gibbs *et al.*

2001, Dickinson 2003). However, it differs relatively strongly from typical *amethystina* in having the underparts (malar area spreading to breast including breast-sides and belly) pale grey rather than greyish-tinged purplish-brown (2), chin and undertail-coverts more whitish than pale rufous (1), breast marked with darkish grey bars (1), and on average a larger size, most notably in tail length (*maculipectus* mean 116 ± 5.47 , $n = 25$; *amethystina* 105 ± 4.08 , $n = 23$; σ 2.3) (2); score 6.

Again, vocal evidence will be crucial in determining the specific status of this form.

Ceyx melanurus mindanensis

Philippine Dwarf Kingfisher is endemic to the Philippines with three subspecies: *melanurus* on Luzon, Polillo and Catanduanes, *samarensis* on Samar and Leyte, and *mindanensis* on Mindanao and Basilan (Dickinson *et al.* 1991, Collar *et al.* 1999). There is insufficient detail in recent reviews of the form *mindanensis*. Fry *et al.* (1992) and Woodall (2001) indicated that it differs from the nominotypical (and also *samarensis*) by lacking the blue neck-spot and having the wings fringed with chestnut (but indicating that *mindanensis* and *samarensis* are similar in size), while Kennedy *et al.* (2000) simply diagnosed *mindanensis* on the lack of the blue neck-spot, but also indicated *melanurus* as the 'smallest'. In reality, nominate *melanurus* and *samarensis* are very similar in appearance although *samarensis* is larger. Meanwhile *mindanensis* differs from both in its lack of a blue neck-patch (2); lack of blue starring on the wing-coverts (2); strong lilac iridescence on the rear submoustachial area, postocular superciliary area, mantle and back and, as strong spangling, from mid-crown to nape (2); dull rufous tips to wing-coverts and edges to secondaries (u [1]); and slightly larger size (sample size for intermediate-sized *samarensis* too small to test against *mindanensis*). A score of 6, with evidence of larger size, leaves *mindanensis* close to species rank, but more work evidently needs to be done, especially as the molecular findings of Marks & Willard (2005) do not tend to support a split.

Orthotomus castaneiceps frontalis (and the relationships of *O. derbianus*)

Dickinson *et al.* (1991) and Kennedy *et al.* (2000) treated the taxon *frontalis* (and the closely related race *mearnsi*) as conspecific with Philippine Tailorbird *Orthotomus castaneiceps* (with races *chloronotus* and *rabori*), although the latter remarked simply that the two forms are sometimes treated as two species. In a footnote Dickinson (2003) explained that in taking this approach these authors were 'awaiting good acoustic evidence of all the races before considering a split'. Inskipp *et al.* (1996) accepted this arrangement.

Madge (2006), however, proceeded with the split, establishing the Rufous-fronted Tailorbird *O. frontalis* (with race *mearnsi*) because it (a) 'differ[s] in vocalizations' (although in the Voice section of Madge's entry on the species this becomes a more tentative 'appears to differ') and (b) 'differs from *O. castaneiceps* principally in having a grey hood, with rufous restricted to frontal mask', while the morphometrics are given as 13 cm and 7 g for *castaneiceps* and

12 cm and 7 g for *frontalis*. These latter data are, however, insufficient to indicate the degree of difference in size between the two. Race *mearnsi*'s slightly more smudged mask and slightly brown-tinged grey crown in no way offer an intermediate to the all-rufous crown of *castaneiceps*, and the differences of (a) *frontalis/mearnsi* from (b) *castaneiceps/chloronotus/rabori* are as follows: rufous mask and grey crown vs rufous crown (3), less extensive white-on-slate streaking on breast of respective males (1), disjunction in size ($\sigma > 2$ for all variables; see Table 1) (2). Clearly with a score of 6 the vocal evidence is crucial.

Parkes (1971) made the case for Grey-backed Tailorbird *O. derbianus* of southern Luzon to be treated as specifically distinct from *O. castaneiceps* owing to its overlap with *O. castaneiceps chloronotus* in central Luzon, and this has been widely accepted (Dickinson *et al.* 1991, Kennedy *et al.* 2000, Madge 2006) (although it would be good to have further confirmation of this circumstance and evidence of how the birds sing and segregate ecologically in the zone of overlap). However, this arrangement leaves the anomalous situation in which Luzon's *chloronotus* continues to be assigned to *O. castaneiceps* (nominotypical race on Bantayan, Guimaras, Masbate, Panay and Ticao, possibly also Calagna-an and Pan de Azucar, with *rabori* on Negros and Cebu: Dickinson *et al.* 1991), in a distribution which leapfrogs *O. derbianus*. This is all the stranger when in morphological terms *derbianus* is closer to *castaneiceps* and *rabori* for its possession of a grey mantle and back (albeit stronger and continuing to the uppertail-coverts). It might therefore be more appropriate for *chloronotus* to be given monotypic species status under the English name 'Green-backed Tailorbird', and for *derbianus* to be united, still under the name Grey-backed Tailorbird, with *castaneiceps* and *rabori* (*derbianus* being the oldest name).

However, further study incorporating vocal evidence of the whole *Orthotomus* complex is clearly needed, and it seems safer to leave any rearrangement until vocal and molecular evidence can be assembled and assessed.

Phylloscopus trivirgatus nigrorum

Philippine populations of Mountain Leaf Warbler lack the bright yellow median crown-stripe (score 2) and broad blackish lateral crown-stripe (score 3) of other populations (except for the Bornean subspecies *kinabaluensis* which, being a distinctive greyish form of *trivirgatus*, has a greyish-white median crown-stripe), replacing them instead with a plain brownish-olive cap. Moreover, they (at least on Luzon, Mindoro and Negros, i.e. *benguetensis* and *nigrorum*, which are the only taxa in BMNH) are paler yellow on the throat and breast (1) (but brighter than *kinabaluensis* with its washed-out yellowish-grey breast), and have a distinctive slight mottling or barring on the submoustachial area which is echoed more weakly on the cheeks and across the throat; total score 6.

As Parkes (1971) noted (himself quoting E. Mayr), the situation is further complicated by the intra-Philippine variability of populations (which includes vocal variability: Kennedy *et al.* 2000), so that only an extensive review by 'some brave soul' of all relevant evidence, morphological, acoustic and genetic, will be likely to produce a coherent arrangement. This seems likely to take considerable time, especially given the existence of three as-yet undescribed races in the Philippine archipelago (Kennedy *et al.* 2000: 272), but F. E. Rheindt (*in litt.* 2011), when mentioning that genetic and acoustic data are particularly important in determining species limits in *Phylloscopus*, reports that research in this area is in hand.

3. Unsupported splits

Loriculus philippensis bonapartei and *L. p. camiguinensis*

Philippine Hanging Parrot *L. philippensis* is a polytypic Philippine endemic for which Forshaw (1989) recognised 11 subspecies, Collar (1997a) 10 and Juniper & Parr (1998) nine, the last-named authors granting species status to one form, *bonapartei* of the Sulu Islands

Table 1. Morphometrics of *Orthotomus frontalis/mearnsi* (Group A) and *O. castaneiceps/chloronotus/rabori* (Group B). * Sample size different from that given is indicated in brackets after the mean. † 'Hind-claw' includes hind-toe.

	Bill	Tarsus	Hind-claw†	Wing	Tail
Group A (n = 30*)					
mean	17.2 (28)	19.9	11.5 (12)	43.4	38.6 (28)
sd	0.52	0.85	0.51	2.25	2.25
Group B (n = 20*)					
mean	18.6	22.1	13.8 (19)	49.7	48.7 (19)
sd	0.83	1.17	0.62	2.94	2.86
Effect size	2.09	2.19	3.99	2.41	3.74

(Sulu or Black-billed Hanging Parrot). Later Tello *et al.* (2006) realised that birds from Camiguin Sur, previously allocated to the Mindanao race *apicalis*, represent a taxon, indeed one in their view so morphologically distinct as to merit species status under the name *Loriculus camiguinensis* (Camiguin Hanging Parrot).

Although *bonapartei* is ostensibly the most distinctive of the Philippine hanging parrots by virtue of having a blackish or dark red (but not bright red) bill (score 2) and dull greyish (not orange) legs (score 3), there is arguably nothing else that distinguishes the form from the suite of other races in *philippensis*. Juniper & Parr (1998) contended that *apicalis* (Mindanao) and *dobertyi* (Basilan) have 'much redder-orange napes and a strong orange suffusion on the mantle', but BMNH material does not wholly support this diagnosis: one specimen of *bonapartei* (91.12.17.2) has a crown identical in coloration and pattern (bright red shading to orange on the nape) to one of *apicalis* (1905.11.26.143) (hence no score), and the mantle suffusion on this latter is weak; but in any case other races of *philippensis* also lack a mantle suffusion, so that its absence in *bonapartei* is not an overall diagnostic feature (again no score). Hence the bill and leg colours are the only consistent morphological difference from other taxa in the species, and in the absence of other evidence these are not enough to raise *bonapartei* to species level.

The form *camiguinensis* is intriguing. Unlike other taxa in the species, it shows no sexual dimorphism, with no distinct male plumage. According to Tello *et al.* (2006), Camiguin birds most resemble females of *L. p. worcesteri* from Bohol, Leyte and Samar and *L. p. apicalis* from Mindanao, but differ as follows:

- (1) The scarlet of the crown... does not extend as far onto the bright olive green nape as it does in both males and females of *L. p. apicalis* and *L. p. worcesteri*...
- (2) The width of the scarlet crown narrows at the rear edge instead of being rounded as in all other populations.
- (3) The scarlet (sometimes orange) throat patch that is typical of males in *L. philippensis* is lacking.
- (4) The face... is extensively turquoise blue and differs from that of females of *L. philippensis* subspecies in that the blue... is darker and more extensive, extending over the eye and onto the throat.
- (5) The turquoise blue in the thighs... is darker than that of *L. philippensis* populations.
- (6) The blue in the inner edges of the rectrices above and throughout below is darker...
- (7) Mean wing chord and tail length of males and tail length of females... are significantly longer than those of nearby *L. philippensis* subspecies.
- (8) The overall green plumage is a darker shade with less of a yellowish tinge, especially on the back (Tello *et al.* 2006).

Part of the difficulty in contemplating this case is that comparisons were in part limited to the populations geographically closest to Camiguin Sur. But is this entirely appropriate? Certainly if we broaden the review to include all other taxa in the species (some of them almost as close), the results look less clear-cut.

Thus concerning point (1) in the diagnosis above, it is to be noted that the scarlet of the crown is also less extensive in nominotypical *philippensis*, *mindorensis*, *bournsi*, *regulus*, *chrysonotus* and *siquijorensis*, so this feature is very hard to interpret. As for (2), this is a variable character in material in AMNH and BMNH; for example, BMNH 96.6.6.1045 (a male *worcesteri* from Leyte) shows a decidedly tapering scarlet crown width of the type reported for *camiguinensis*. Point (3) is incontrovertible. Using the photographs in Arndt (2006) it is possible to see that point (4) is likely to be valid in terms of colour shade; however, at least two specimens in BMNH possess as extensive facial blue as in *camiguinensis*, a nominotypical from Marinduque (96.6.6.1023) and an *apicalis* from Mindanao (1905.11.26.147). The shade of blue on the thighs and tail (points 5 and 6) is extremely hard to gauge and seems to be a rather variable feature on other populations and taxa. Wing and tail size differences (point 7) may be significant but still involve considerable overlap,

and comparison was made with only three other taxa; reference to Forshaw (1989) shows that the forms *chrysonotus* and *siquijorensis* appear to rival and perhaps match *camiguinensis* on wing and tail length. Overall plumage shade (point 8) seems dubious: it is not obvious in Arndt's (2006) photographs, and if the comparison was only made with *apicalis*, which has a slightly yellow-tinged mantle (see above), a possible distortion may have occurred since most other taxa lack yellow tinges in this area.

Therefore it seems that the case for species status rests on two unequivocal characters, namely the absence of sexual dimorphism (score 3) and a richer (but not more extensive) blue face (score 1), total score 4. It is worth noting, moreover, that the circumstance of sexual monomorphism in an otherwise sexually dimorphic species (or vice versa) has not normally, in itself, been considered a trigger of species status, e.g. *Anas platyrhynchos diazi*, *Falco tinnunculus neglectus*, *Alisterus amboinensis sulaensis*, *Brachypteryx montana goodfellowi*, *Pachycephala pectoralisfeminina* and *P. p. xanthoprocta*, *Petroica macrocephala dannefaerdi*, *Malurus alboscapulatus aida*, *M. a. kutubu* and *M. a. moretoni*, *Oriolus cruentus vulneratus*, *Phrygilus unicolor inca*.

DISCUSSION

In total, 26 avian taxa that either were almost always (15, of which 12 are in the Philippines) or are still often (11, with 9 in the Philippines) regarded as subspecies are here given support as species using quantitative criteria as outlined in Tobias *et al.* (2010). Moreover, six near-splits involving Philippine endemics are outlined without reaching a conclusion, and two proposed splits are considered to be unwarranted on the basis of the same criteria.

Of course the taxonomic treatment of allopatric forms represents a series of hypotheses that are always open to new evidence, and no method for the evaluation of such forms is without its limitations. This contribution is by no means a comprehensive revision of the Philippine avifauna; it is merely an attempt to support a process that is likely to gather momentum over the next decade or so. In due course, a considerable number of further taxa may be scrutinised with the additional use of vocal data, which have largely been absent in this review; fieldworkers and birdwatchers are strongly encouraged to step up their efforts to document the voices of the Philippine avifauna. It is now 15 years, for example, since Morris (1996) reported on a population of White-browed Shortwings *Brachypteryx montana* identified entirely by their different voice, but many other such cases may await discovery.

Moreover, because of the very serious levels of habitat destruction in the Philippines, plus the concomitant problems of hunting, there is a real urgency to scrutinise the country's avifauna in more depth, in terms not only of taxonomy but also of conservation biology. Thus while it is clearly vital to compile data on the conservation status of the species established in this paper in order to determine their IUCN Red List category, it is equally important that, with an avifauna as complex and taxonomically unsettled as the that of Philippines, distinctive populations of all taxa are documented in greater detail, since some and perhaps many will in due course also be elevated to species level.

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